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A STUDY OF HIGH-SCHOOL GRADES

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The amount of time and labor expended by high-school teachers in grading their pupils from day to day, and in making reports at stated monthly, quarterly, or half-yearly intervals, is enormous. When there is added the very considerable labor performed by the principal, or in larger schools by clerks, in transferring these reports to the permanent records of the school, it is safe to say that the value of the results is in no way commensurate with the effort involved. In general, very little use has been made of these records except in determining promotions and in assigning a small number of honors and distinctions, regarding which there is not infrequently doubt as to whether the lot has fallen in the proper place. A very superficial study indicates the absence of any uniformity of standard in grading between the high school and the college, between different high schools, and within the same high school between different departments and even between different teachers in the same department.

The following study of grades in the University High School shows that the records of a school furnish material for scientific investigation of a large number of administrative problems, such as the relative effectiveness of different departments and teachers and the effect of mid-year promotions. Similar investigations of many other problems have been made or are in process of making. The conditions discovered and the results secured may be peculiar to this one school and may be of no general educational value. The study is presented as a suggestive type, showing that the records to be found in every school office may be used as a basis for a study of the validity of the school's procedure and for changes where such study

indicates that the methods employed are ineffective. Such a use of school records justifies the labor that has entered into their preparation.

This study extends over the years 1907-8 and 1908-9. The material here presented is taken chiefly from the latter year. The method of grading in the school makes 60 the passing mark. Grades are reported by teachers and recorded in multiples of 5 only. Grades below sixty are designated by the letter F, 60 and 65 by D, 70 and 75 by C, 80 and 85 by B, and 90 and 95 and a possible 100 by A.

1. *Normal distribution of grades.*—The percentages of pupils receiving each grade for the two years correspond very closely and may be taken as the normal distribution for the school. It should be kept in mind that this is not proposed as a norm for other schools, but for the purposes of this study is used as a norm for this school. The following table gives the number of grades recorded for each year, and, under the letters used to designate the five different grades, the percentages of pupils receiving each grade. Thus in 1907-8 11.4 per cent of all grades received by pupils were F; 23.3 per cent, D; 28 per cent, C; 27 per cent, B; and 10.3 per cent, A. This table is represented graphically in Fig. 1.

Year	No. of Grades	F	D	C	B	A
1907-8.....	6429	11.4	23.3	28.0	27.0	10.3
1908-9.....	7297	11.5	18.9	30.6	27.0	12.0
Average.....	6863	11.4	21.1	29.3	27.0	11.2

In explanation of this and the subsequent Figs. 2-12 it may be said that the vertical lines represent the five grades employed, denoted by the letters below; the horizontal lines crossing the verticals at distances representing five points each enable us to determine the point at which the curve crosses the verticals. (In actual practice the ordinary cross-lined paper is most suitable for preparing such graphs.) In Fig. 1 the unbroken line represents the distribution of grades for 1907-8, the broken line the distribution for 1908-9, and the dotted line the average of the two. In comparing the table above with the figure it will

be observed that the distribution for 1907-8 gives 11.4 per cent F grades, represented in the figure by the point on the vertical line F at which the unbroken line begins; 23.3 per cent D grades, represented by the point on the vertical line D cut by the unbroken line from the line F to the line D; 28.0 per cent C grades, represented by the point on the vertical line C cut by

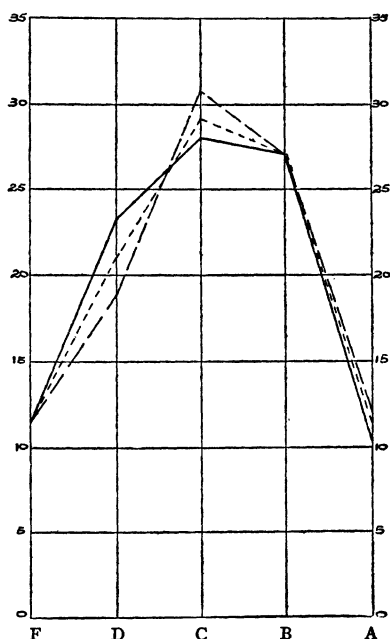


FIG. 1

Normal -----
 1907-8 —————
 1908-9 - . - . - .

the unbroken line from D to C; in like manner the percentage of B grades and of A grades, 27.0 and 10.3 respectively, are represented by the points on lines B and A at which these are cut by the unbroken line. This unbroken line, cutting in succession the lines F, D, C, B, and A, is the curve representing the distribution of grades of the entire school for the year 1907-8. Similarly the broken line, crossing the vertical lines at the points corresponding to the percentages given in the table, represents

the distribution of grades in 1908-9; and the dotted line represents the average of the other two which is assumed in this study as the normal for the school.

2. *Departmental variations.*—The following table shows the number and percentage of pupils receiving each grade in each department for the year 1908-9:

DEPARTMENT	No. OF GRADES	F		D		C		B		A	
		No.	Per-centage	No.	Per-centage	No.	Per-centage	No.	Per-centage	No.	Per-centage
Latin and Greek	886	94	10.6	143	16.1	282	31.8	208	23.5	159	17.9
German.....	416	35	8.4	81	19.5	110	26.4	119	28.6	71	17.1
French.....	475	52	10.9	89	18.7	157	33.0	133	28.0	44	9.3
English.....	1,514	235	15.5	329	21.7	497	32.8	354	23.4	99	6.5
History.....	825	67	8.1	131	15.9	258	31.2	248	30.0	121	14.7
Mathematics...	1,466	212	14.5	370	25.2	405	27.6	310	21.1	160	11.5
Science.....	672	56	8.3	113	16.8	186	27.7	219	32.6	98	14.6
Shop and Drawing.....	867	76	8.8	122	14.1	289	33.3	287	33.1	93	10.7
Domestic Science.....	176	10	5.7	4	2.3	48	27.3	91	51.7	23	13.1
Total.....	7,297	837	11.5	1,382	18.9	2,232	30.6	1,969	27.0	877	12.0

A comparison of these percentages shows a wide variation. For instance, the percentage of failures in English (15.5) is almost double that in history (8.1), while the percentage of A grades in Latin and Greek (17.9) and in German (17.1) is almost three times as great as in English (6.5). These variations may be seen more readily by comparing the curve of each department with the normal curve in Figs. 2-10 following. In each figure the broken line represents the normal or average distribution of grades for the entire school, and the unbroken line represents the distribution of grades of the department under consideration.

A careful comparison of these curves shows that in the departments of Greek and Latin, German, history, science, shop and drawing the grades run considerably higher than the normal, and that in the departments of English and mathematics the grades are much lower than the normal; that the grades in French approach most closely to the normal; that the domes-

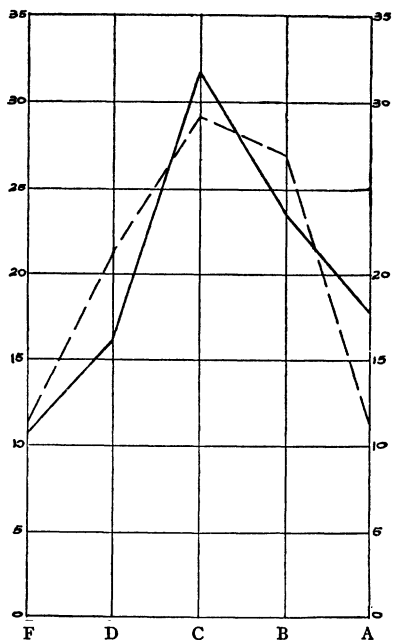


FIG. 2

Normal -----
 Greek }
 Latin }

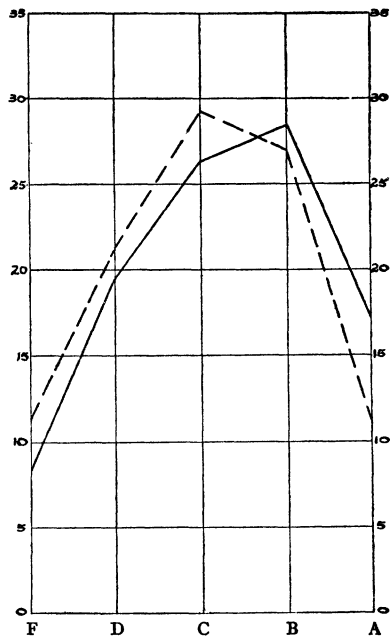


FIG. 3

Normal -----
 German -----

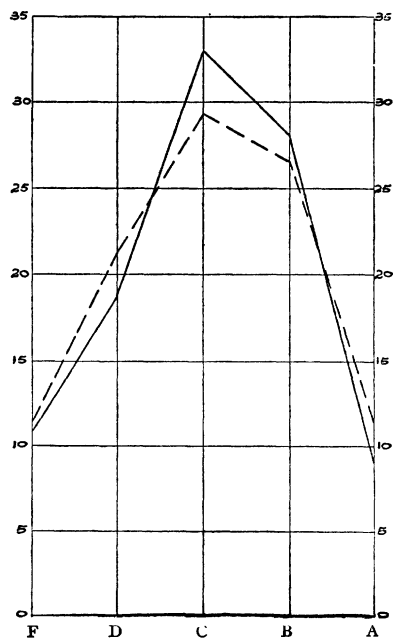


FIG. 4

Normal -----
 French -----

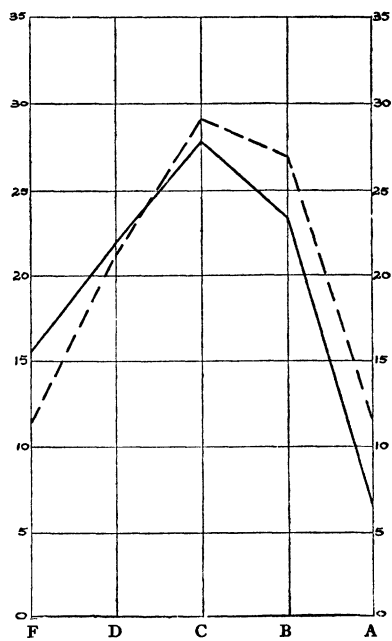


FIG. 5

Normal -----
 English -----

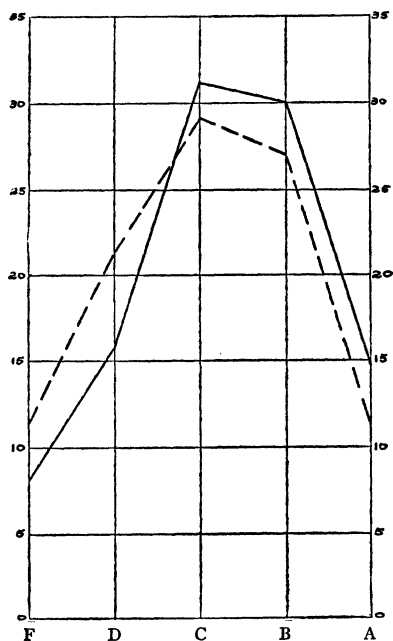


FIG. 6

Normal ----
History ———

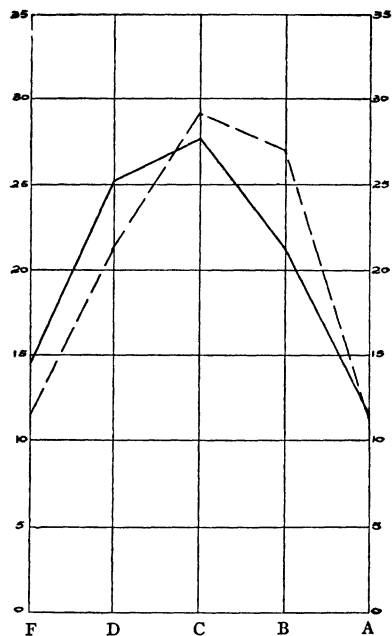


FIG. 7

Normal ----
Mathematics ———

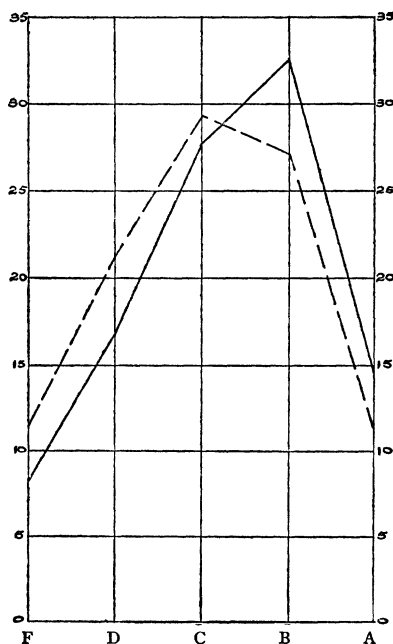


FIG. 8

Normal ----
Science ———

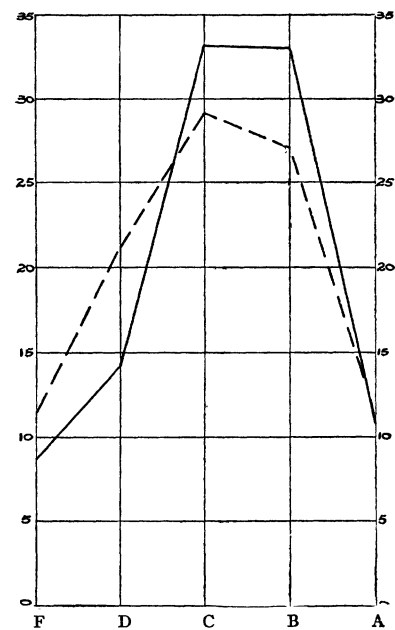


FIG. 9

Normal ----
Shop and Drawing ———

tic science curve is very erratic, owing to the fact that more than one-half of the entire number of grades are B. There is nothing to indicate that these wide variations in the grades

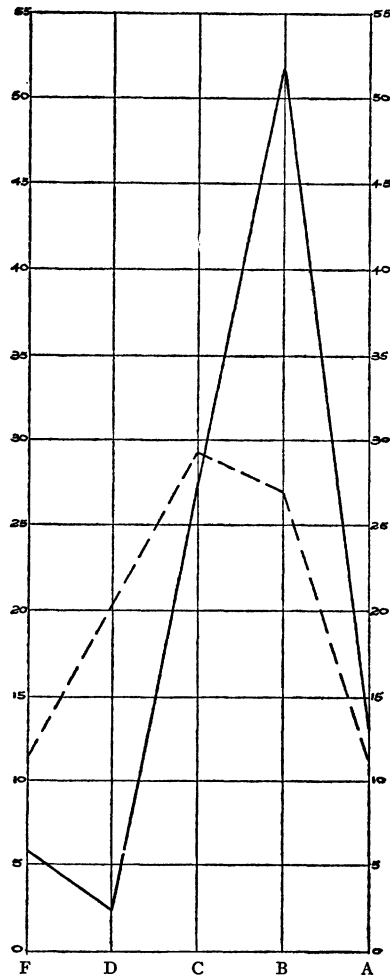


FIG. 10

Normal — — — — —
Domestic Science —————

of the different departments represent any corresponding differences in the quality of the results secured; they are due almost wholly to a lack of uniformity in grading.

3. *Variations of individual teachers.*—A study of the methods of grading used by individual teachers shows far more striking differences. Fig. 11 shows the curves representing the

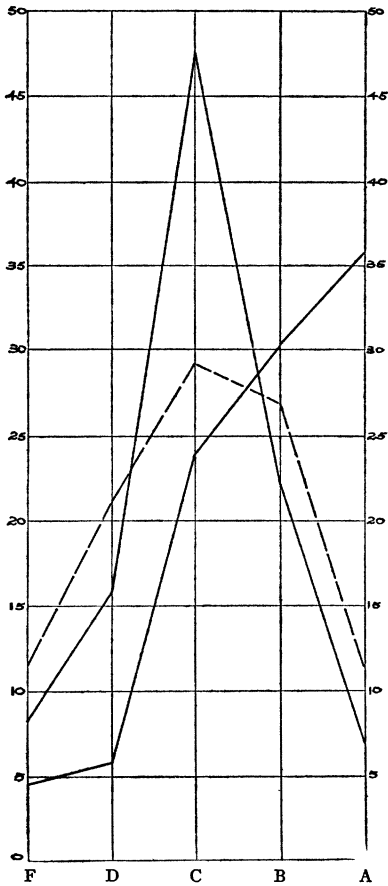


FIG. 11

Normal ————
 Grades of two teachers
 in the same department. } ————

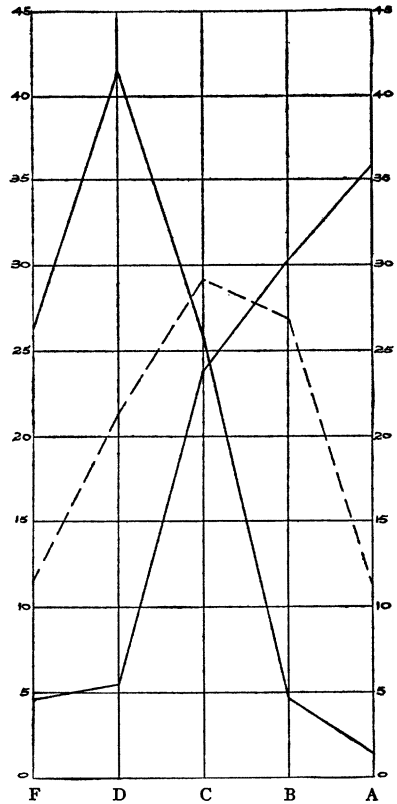


FIG. 12

Normal ————
 Grades of two teachers
 in different departments. } ————

grades given for the year by two teachers in the same department; Fig. 12 shows the curves for the two teachers, not in the same department, whose use of grades varies most widely of all. In Fig. 11 should be noted the unusual predominance of the grades

A and C, and in Fig. 12 the predominance of the grades, A, D, and F. While with individual teachers slight differences in the use of grades may represent different degrees of effectiveness or differences in the actual abilities of pupils, no such reason could possibly be assigned for the remarkable variations shown in these figures. In general it may be assumed that wide variations are due to the lack of a uniform standard in the use of grades employed.

4. *Efficiency of individual teachers.*—The efficiency of individual teachers may be studied by a comparison of the grades which their pupils receive in one year with the grades received by the same pupils in the following year. If a uniform standard of grading were employed by all the teachers in a department the results of such a comparison based on a large number of cases would furnish a reliable basis for determining the comparative efficiency of different teachers. In the present case there is not a sufficiently uniform standard in the use of grades nor is there in every instance a sufficient number of pupils to make the results of great significance. The following table makes such a comparison for the departments of English and mathematics, and the results may be regarded at least as indicating a reasonable inference as to the efficiency of the teachers involved. In mathematics five teachers taught first-year pupils who in the second year were rather evenly distributed among four of these same teachers. In English three teachers taught first-year pupils, who in the second year were rather evenly distributed among the same three and two other teachers. The individual variations in the use of grades are therefore in some degree compensated for, though not enough pupils are involved to make the results certainly reliable. This table shows in the first column the percentage of the first-year pupils under each instructor who received a lower grade in the work of the second year, in the second column the percentage of pupils who received a higher grade, in the third column the average loss (in one case gain) per pupil, in the fourth column the percentage of pupils who passed in the work of the first year who actually

failed in the second year. The teachers are designated by numbers.

Department	Teacher	Percentage of Pupils Receiving Lower Grade in Second Year	Percentage of Pupils Receiving Higher Grade in Second Year	Average Loss per Pupil in Grade of Second Year	Percentage of Pupils Failing in Second Year
Mathematics....	1	58.3	33.3	7.7	16.7
	2	63.2	30.5	3.4	10.5
	3	64.3	14.3	4.6	0.0
	4	50.0	41.7	1.4	8.3
	5	84.6	7.7	7.0	30.8
English.....	1	40.0	45.0	2.5 (gain)	5.0
	2	45.8	37.5	2.4	4.2
	3	69.0	31.0	1.5	10.3

From this table it is a reasonable conclusion that in the department of mathematics teachers 3 and 4 are the most effi-

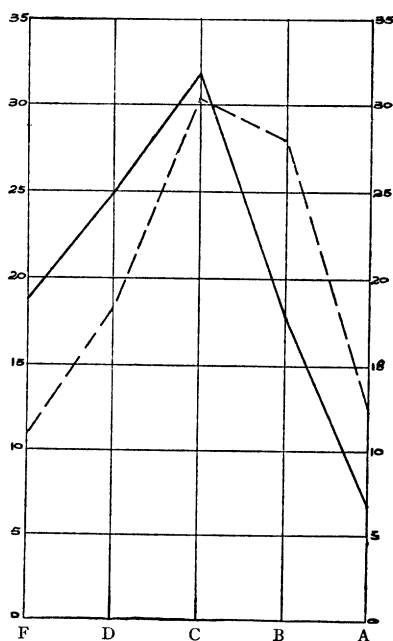


FIG. 13

Grades of Mid-Year Classes ———
Grades of Other Classes - - -

cient in the instruction of first-year pupils. The results shown by the table are less conclusive for the English department, but

seem to indicate that teacher 1 is the most efficient of the three.

5. *Mid-year classes.*—A study of the grades of the mid-year classes indicates that the quality of their work is distinctly inferior to that of the regular autumn classes and suggests serious question as to the advisability of admitting classes at the middle of the year. Fig. 13 shows graphically a comparison of the grades of mid-year classes with those of the other classes.

6. *Variations in departmental grades for different years.*—A comparison of the grades given for the work of different years in those departments in which the work is continuous raises some interesting questions regarding the content of the courses offered and the methods employed. The following table and Fig. 14 show the percentage of failures in the different years in five departments:

PERCENTAGE OF FAILURES BY YEARS

Subject	First Year	Second Year	Third Year	Fourth Year
Latin.....	14.1	9.0	2.9
German.....	12.4	7.4
French.....	14.3	9.6	3.1
English.....	18.1	9.5	18.4	14.4
Mathematics.....	12.9	12.9	13.6	5.6

In general we should expect that in a well-organized department the number of failures would diminish each year. The above table and Fig. 14 show this to be the case in Latin, German, and French, but in both English and mathematics there is an increase of failures in the third year over the first and second years. This is most marked in English, in which the percentage of failures in the third year is almost double that in the second. It is the purpose of this article to show the facts rather than to discuss the causes, both of which in this case may be due to conditions peculiar to the University High School. It may be pointed out, however, that the methods employed in French and German are such that few pupils enter advanced classes who have not had the earlier work in the school, so that there is in these departments a greater uniformity of training than is

found in the advanced years in other departments; in Latin only the better pupils continue after the second year, as the colleges in the North Central Association accept two units of Latin for admission. All the pupils in the school take English, and the

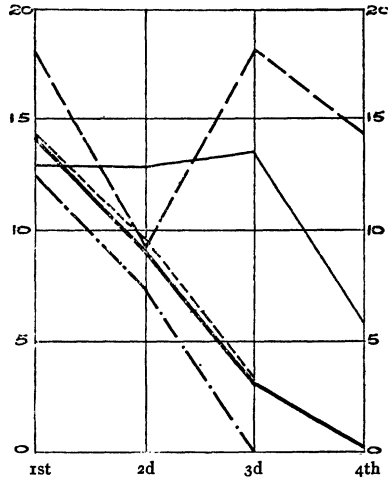


FIG. 14

Percentage of Failures by Years
 Latin —————
 German
 French - - - - -
 English - - - - -
 Mathematics ————

larger part of the third-year pupils take mathematics. These facts, however, are probably insufficient to account for the increase in failures in these subjects in the third year, which calls for a careful study of conditions with a view to possible modification in the work in these departments.